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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/649,528	08/28/2000	Chowdary Ramesh Koripella	CT00-013	8469

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MOTOROLA, INC.
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EXAMINER	
LEUNG, JENNIFER A	
ART UNIT	**PAPER NUMBER**
1764	

DATE MAILED: 12/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/649,528	KORIPELLA ET AL.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-11,13-18,20 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-11,13-18,20 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on September 18, 2003 has been received and carefully considered. Claims 2, 12 and 19 are cancelled. Claims 1, 3-11, 13-18, 20 and 21 remain active.

Terminal Disclaimer

2. The terminal disclaimer filed on September 18, 2003 disclaiming the terminal portion of any patent granted on this application that would extend beyond the expiration date of U.S. Patent No. 6,569,553 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 3-11, 13-18, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al. (US 5,858,314) in view of Ashmead et al. (US 5,534,328).

Regarding claims 1 and 10, Hsu et al. (FIG. 1, 2A-2C) disclose an apparatus comprising:

- a multi-layer, monolithic ceramic carrier (column 6, lines 22-29) defining a fuel processor, the fuel processor including a vaporization zone (i.e., the region to "pre-heat the incoming reactants... to near operation temperatures, e.g., at least about 300 °C"; column 5, lines 42-45, 64-68) and a reaction zone (i.e., defined by reformer plates **14**) including a reforming catalyst material **36**;
- at least one channel formed in the monolithic structure for transporting fuel in the vaporization zone (i.e., as defined by the pre-heat region discussed above);
- at least one channel for transporting a vapor in the reaction zone (i.e., passages formed by plates **12, 14**; FIG. 1, 2A-C);
- an inlet channel (i.e., via axial manifold **16**) for introducing liquid fuel into the fuel processor (column 4, lines 31-41); and
- an outlet channel (i.e., via exit conduits **32**) for transporting hydrogen enriched gas out of the fuel processor.

In view of the newly added limitations, Hsu et al. further shows the monolithic ceramic carrier being joined to define an integral structure (see FIG. 3), but is silent as to whether the ceramic carrier may comprise an integral, *sintered*, monolithic ceramic carrier.

Ashmead teaches an integral, *sintered*, monolithic ceramic carrier **10** (FIG. 1; column 6, lines 19 to column 7, line 22) which may, "readily be adapted to effect all or nearly all chemical reactions that one may conceive," (column 5, lines 55-column 6, line 8), wherein the ceramic carrier is formed by plurality of laminae (i.e., **100**, **200** ... **1000**, **1100**; FIG. 1) which define a plurality of microchannels (column 3, lines 37-47) for conducting chemical reactants and products from an inlet port (i.e., through ports **20**, **24** and vias **20V**, **24V**) to an outlet port (i.e.,

through vias **30V**, **34V** and ports **30**, **34**; FIG. 4) via a given vaporization zone (i.e., thermally communicating with electrical heater **36** and second heat exchanger **86**; column 13, lines 54-66) and reaction zone (i.e., catalytic reactor **90'**; FIG. 16; column 13, lines 11-22). The preferred joining technique of "thermal fusion bonding" (column 6, lines 51-54) forms a coherent mass by heating without melting, which is essentially the definition of "sintering".

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute an integral, *sintered*, monolithic ceramic carrier for the integral, monolithic ceramic carrier of Hsu et al. because in contrast to the prior art reactors (i.e., those defined by a plurality of individual plate-like elements that are clamped or welded together, as described in column 2, lines 3-30 and substantially similar the apparatus of Hsu et al.), Ashmead et al. teaches, "The unique ability to fusion bond silicon and other group III, IV and V materials to form a multilayer solid, leak proof monolithic structure facilitates economical fabrication of complex chemical processing apparatus, which are both compact and intrinsically safe, from a plurality of simple wafers," (column 7, lines 16-22; column 7, line 58 to column 8, line 26).

Regarding claims 3 and 7, Hsu et al. discloses an integrated heat source (i.e., via conductive plates **12**; column 5, lines 37-42, 54-68; column 8, lines 4-column 9, line 7) thermally coupled to the reaction zone and vaporization zone using thermally conductive channels or thermally conductive vias (i.e., conductive plate **12** comprising "any surface indentation or protrusions, which can be formed by embossing"; column 4, lines 46-55).

Regarding claim 4, Hsu et al. is silent as to the integrated heat source (i.e., conductive plates **12**) comprising a resistive heater that is electrically driven. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select a

resistive heater for the integrated heat source in the apparatus of Hsu et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, since the use of resistive heaters as a reaction heating means is conventionally known in the art, as evidenced by Ashmead et al. (i.e., electrical heater **36** comprising metallization pattern **236**; FIG. 2, 6). Furthermore, substitution of known equivalent structures or one known equivalent technique for another involves only ordinary skill in the art.

Regarding claims 5 and 6, Hsu et al. discloses the integrated heat source may comprise a chemical heater including a catalyst for oxidizing fuel to produce heat (i.e., combustion band **92** for providing thermal energy to the endothermic reforming reactions; column 5, lines 46-68, FIG. 5; column 8, line 4 - column 9, line 7), wherein the chemical heater further comprises an air inlet for providing oxygen for the oxidation of the fuel and the inlet channel **16** includes an opening to provide fuel to the chemical heater (column 8, lines 11-16).

Regarding claim 8, Hsu et al. discloses the vaporization zone and the reaction zone comprising a plurality of parallel channels (i.e., passages formed by plates **12, 14**; FIG. 1, 2A-C).

Regarding claims 9 and 17, Hsu et al. disclose a plurality of channels comprising, "any surface indentations or protrusions, which can be formed by embossing," (column 4, lines 46-55). However, Hsu et al. is silent as to whether the channels may comprise a serpentine shape. In any event, it would have been obvious choice for one of ordinary skill in the art at the time the invention was made to select serpentine shaped channels for the plurality of channels in the apparatus of Hsu et al., on the basis of suitability for the intended use (i.e., depending on the chemicals being reacted), since changes in shape involves only ordinary skill in the art. Furthermore, Ashmead et al. evidences the conventionality of providing serpentine shaped

reactor channels (i.e., spiral channel reactor **90**, FIG. 15; column 5, lines 58-63; column 7, lines 58-61; column 14, lines 55-64).

Regarding claims 11 and 18, the same comments with respect to Hsu and Ashmead apply (i.e., see claims 1, 3, 7, 8 and 10 above).

Regarding claims 13, 14, 20 and 21, the same comments with respect to Hsu and Ashmead apply (i.e., see claims 5 and 6 above).

Regarding claim 15, the same comments with respect to Hsu and Ashmead apply (i.e., see claims 3 and 7 above).

Regarding claim 16, the same comments with respect to Hsu and Ashmead apply (i.e., see claim 8 above).

Response to Arguments

4. Applicant's arguments with respect to claims 1, 3-11, 13-18, 20 and 21 have been considered but are moot in view of the new grounds of rejection, as necessitated by amendment.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be

calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is *703-305-4951***. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

*** As of December 10, 2003, the telephone number will be changed to 571-272-1449.*

Jennifer A. Leung
November 25, 2003

Hien Tran

HIEN TRAN
PRIMARY EXAMINER